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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,135	02/14/2002	Seth R. Stern	100/11020	8863

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EXAMINER

BARTON, JEFFREY THOMAS

ART UNIT PAPER NUMBER

1753

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/076,135

Applicant(s)

STERN ET AL.

Examiner

Jeffrey T. Barton

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed on 25 July 2005 does not place the application in condition for allowance.

Status of Objections and Rejections Pending Since the

Office Action of 24 August 2004

2. The objections to the drawings and specification are withdrawn due to Applicant's amendment.
3. The rejections of claims 1-5, 8-11, and 22-25 under 35 U.S.C. §102(b) and (e) as anticipated by Becker et al (US 5,993, 632) and Becker et al (US 6,641,708) are withdrawn due to Applicant's amendment.
4. The rejection of claim 12 under 35 U.S.C. §103(a) as unpatentable over Becker et al (US 6,641,708) in view of Chow et al is withdrawn.
5. All other rejections are maintained.
6. The indicated allowability of claims 6, 7, and 21 is withdrawn due to the introduction of new matter to the claims.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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8. Claims 1-11 and 13-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant points to Page 9, lines 5-15 of the specification to support this amendment. The cited passage reads in part: "An electrical control system of the invention typically applies a *maximum* voltage of between about 100 V_{RMS} and about 10000 V_{RMS}." (Italics added) This does not support a claim limitation requiring a voltage above 100 V_{RMS}, because there is no indication that the system described in the specification is solely intended for use at voltages above this threshold. Indeed, designation of these limits as "maximum voltage[s]" in the specification clearly implies that applied voltages below these thresholds were contemplated. Additionally, more explicit recitation of applied voltages below 100 V was given elsewhere in the specification. (Page 22, lines 15-19) See MPEP § 608.04 to § 608.04(c) and *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claim 12 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Becker et al. (US 6,641,708)

Becker et al disclose a method of applying an electrical current through a fluid-containing cavity comprising: providing a fluid-containing cavity (Column 3, lines 50-55); contacting two electrodes with the fluid in the cavity, both electrodes having a relevant surface area in contact with the fluid (Column 4, line 39 - Column 5, line 2); and applying an alternating current from a current source to the fluid via these two electrodes. In addition, Becker et al disclose the application of a voltage of less than 1 V to the fluid in the cavity via the electrodes. (e.g. Column 24, lines 7-10) If the applied voltage is below 1 V, then the voltage drop across the interface between the electrode and fluid must inherently be below 1 V. Becker et al also disclose the selection of electrode width, which corresponds to electrode surface area for a chamber of given dimensions (Column 16, lines 17-43), and the purposeful avoidance of electrolysis by frequency selection. (Column 49, lines 50-53) The disclosed purpose of maintaining the voltage drop below 1V in the instant application is also to avoid electrolysis.

It is the Examiner's position that since Becker et al teach the selection of electrode width and frequency, and application of a voltage below 1 V, which would inherently result in a voltage drop as claimed, the limitations of lines 10-12 of this claim are inherently met.

Since Becker et al teaches the limitations of the instant claim, the reference is deemed to be anticipatory.

In addition, the presently claimed voltage drop across the interface of the fluid with electrodes of selected width using a selected frequency would obviously have been present once the method of Becker et al is performed. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 U.S.C. §103 in addition to the rejection made above under 35 U.S.C. §102.

14. Claims 1-5, 8-11, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker et al. (US 6,641,708)

Regarding claims 1 and 22, Becker et al disclose a system for and a method of applying an electrical current through a fluid-containing cavity comprising: providing a fluid-containing cavity (Column 3, lines 50-55); contacting two electrodes with the fluid in the cavity, both electrodes having a relevant surface area in contact with the fluid (Column 4, line 39 - Column 5, line 2); applying an alternating voltage of 50 V from a current source to the fluid via these two electrodes (Column 8, line 58 - Column 9, line 4); wherein the frequency and relevant surface area are selected to avoid generation of gas bubbles at either electrode (Column 4, lines 57-67; Column 16, lines 17-58; Column 49, lines 50-53)

Regarding claims 2, 3, 23, 24, and 25, Becker et al disclose using AC frequencies in excess of 10 kHz. (Column 8, line 67 - Column 9, line 4)

Regarding claim 4, Becker et al disclose the electrodes being patterned on a first surface of the cavity (Column 4, line 67 - Column 5, line 2) and the relevant surface area comprising a first edge of the first electrode that faces the second electrode along a path of the electrical current. (Figures 1B, 2B, and 2C, upon application of a potential between the electrodes of Figure 1B, the relevant areas will comprise electrode edges that provide the narrowest gap between electrodes)

Regarding claim 5, Becker et al disclose the first edge of the first electrode being configured to provide substantially uniform current across the first edge (Figure 1B, electrode digits are parallel, current will be uniform along most of the length of the digits)

Regarding claim 8, Becker et al disclose electrodes disposed on opposing surfaces of the cavity, with the relevant surfaces of the electrodes disposed in substantially directly facing opposition. (Figure 2D; Column 15, line 65 - Column 16, line 5; Column 16, lines 17-29)

Regarding claims 9-11, Becker et al disclose the preferred distance between the walls on which the opposing electrodes are disposed being between 20 and 600 microns. (Column 16, lines 1-5)

Becker et al do not explicitly disclose applying a voltage of greater than 100 V_{RMS} to the fluid through the electrodes.

However, it would have been obvious to one having ordinary skill in the art that selection of an appropriate voltage in such a system depends on the size of the particles that are manipulated, the dielectric constants of the fluid in the chamber and the material being manipulated, and the relative chamber and electrode dimensions,

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among other variables. Selection of a voltage that is only a factor of two higher than that suggested very generally by Becker et al (Column 8, line 67 - Column 9, line 4) would be well within the level of ordinary skill in the art, depending on the nature of the material(s) being analyzed and the specific geometry of the system.

15. Claims 13-20 and 26-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker et al (US 6,641,708) in view of Witt et al.

Relevant to claims 13 and 26, Becker et al disclose a system for and a method of applying an electrical current through a fluid-containing cavity comprising: providing a fluid-containing cavity (Column 3, lines 50-55); contacting two electrodes with the fluid in the cavity, (Column 4, line 39 - Column 5, line 2); and applying an alternating voltage of 50 V from a current source to the fluid via these two electrodes. (Column 8, line 58 - Column 9, line 4) They also suggest additional electrodes (Column 4, lines 47-56) and describe a method suitable for providing them. (Column 5, lines 2-33)

Relevant to claims 14 and 32, Becker et al disclose the use of voltages below 1000V. (Column 8, line 67 - Column 9, line 4)

Relevant to claims 15, 16, 30, and 31, Becker et al disclose varying conductivity of the cell suspension medium, which is the fluid in contact with the electrodes. (Column 9, lines 4-7) The resistance between electrodes can be maintained below 75 ohms, depending on the selection of this medium.

Relevant to claims 17-19 and 27-29, Becker et al disclose preferred electrode spacing of 1 - 100 microns along the path of current flow. (Column 16, lines 17-29)

Relevant to claim 20, Becker et al disclose the application of alternating current to these electrodes. (Column 8, line 58 - Column 9, line 4)

Becker et al do not explicitly disclose applying a voltage of over 100 V_{RMS} to the fluid, a third electrode disposed in electrical contact with the fluid in a location such that the location of the second electrode is between the locations of the first and third electrodes, or the application of a current between the second and third electrodes.

Witt et al disclose a device and method comprising preparation of three sets of electrodes in an interdigitated array, with different AC signals provided to the electrodes. (Figure 1; Column 5, line 40 - Column 6, line 7)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device and method of Becker et al by providing a third set of interdigitated electrodes with independent AC signal, as taught by Witt et al, because Becker et al suggested additional electrodes and it would provide greater control of the separation.

Regarding the limitation to an applied voltage above 100 V_{RMS} , it would have been obvious to one having ordinary skill in the art that selection of an appropriate voltage in such a system depends on the size of the particles that are manipulated, the dielectric constants of the fluid in the chamber and the material being manipulated, and the relative chamber and electrode dimensions, among other variables. Selection of a voltage that is only a factor of two higher than that suggested very generally by Becker et al (Column 8, line 67 - Column 9, line 4) would be well within the level of ordinary skill

in the art, depending on the nature of the material(s) being analyzed and the specific geometry of the system.

Response to Arguments

16. Applicant's arguments filed 1 March 2005 have been fully considered but they are not persuasive.

As an initial matter, the amendment to claims 1-11 and 13-32 that the applied voltage(s) be above 100 V_{RMS} is considered by the Examiner to be new matter, as detailed in the rejection under 35 U.S.C. §112 above. However, even if it were not new matter, the choice of a voltage within a factor of two of the generally disclosed voltage range of the prior art is considered to lie within the level of ordinary skill in the art.

Regarding the previous rejection of claim 12, Applicant argues persuasively that Chow et al do not specifically address the voltage drop across the electrode/fluid interface, instead describing a "voltage drop across the lead", which is not relevant to the claim, in itself. This rejection is withdrawn, accordingly. New grounds of rejection are presented above.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey Barton, whose telephone number is (571) 272-1307. The examiner can normally be reached Monday-Friday from 8:30 am – 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached at (571) 272-1342. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

JTB
September 27, 2005

ALAN DIAMOND
PRIMARY EXAMINER

Tech Center 1700

A handwritten signature in black ink, appearing to read 'Alan Diamond', with a long horizontal flourish extending to the right.